RCEME TECHNICAL BULLETIN

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RESTRICTED

RCEME
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The distribution of the Technical Bulletin should now make it possible for all workshop personnel to see it, thus its value a means of disseminating technical information will be enhanced.

In addition to the senior officers who will continue to receive a copy, each workshop will be given a certain number of copies, depending on the number of personnel employed. These copies are intended to be circulated within the shop so that ALL ranks and civilians concerned will see them.

RCEME DISTINCTIVE COLOURS

By Lt Col RH Hodgson

A search of their records by the War Office has failed to uncover the origin and meaning of the three distinctive colours used by REME. The general opinion, from inquiries made at various sources, is that the colours were adopted from the three corps that contributed men to form REME. These colours and corps are:

Blue	-	Royal Engineers
Yellow	-	Royal Army Service Corps
Red	-	Royal Army Ordnance Corps.

The Master General of Ordnance authorized red, yellow (gold) and dark blue on 6 July 1954 as the colours for the RCEME coloured field service cap. The Corps lanyard consisting of four twisted strands, two dark blue, one red and one yellow (gold) was approved on 10 Jan 1945. Subsequently the Corps lanyard of three strands, one each of blue, gold and scarlet was adopted and is now authorized in Orders and Instructions for Dress.

The RCEME tie was approved in 1947 and the description in the DEME Departmental Instructions was "light navy blue field with diagonal red 5/32 inch and golden yellow 3/32 inch stripes placed together, at intervals of 3/4 inch, with the golden yellow stripe uppermost". This description of the RCEME tie appears to have established a precedence of the Corps distinctive colours as gold, red and blue. The description of the RCEME tie found in RCEME Corps Instructions (Adm No. 4, 1 May 1952. *) is;

> "The field is light navy blue with a two-colour 1/4 inch stripe at 3/4 inch intervals. The stripes run diagonally downward from the left shoulder of the wearer at an angle of 45 degrees from the horizontal.
>
> "The upper 3/32 inch of the two-colour stripe is golden yellow and the lower 5/32 inch is red".

The RCEME corps flag originally was authorized by CA (overseas) RO 3860 dated 24 Sep 1943 for use by field and base units. The design consisted of a flag, trisected vertically, the colours commencing at the hoist were blue, yellow (gold) and red with a green maple leaf in the central division. The design now authorized in CAO54-3, describing corps and regimental flags was submitted by DME on 22 Jul 1946. This design trisects the flag horizontally into three equal divisions with the upper division dark blue, the central division gold, and the lower division scarlet. The use of horizontal in place of vertical divisions was stated to have been adopted due to some confusion in distinguishing the RCEME corps flag from some national flags. The "scarlet" division was originally described as "red", however, the colour "red" was altered to read "scarlet" in the 1955 revision of CAO 54-3. There is no record of the reason for this change. The next revision of CAO 54-3 will show "royal blue" instead of "dark blue".

The following colours appear to have been in use by RCEME in the precedence shown below:

Lanyard		Tie		Corps flag
Blue	Light navy blue		Golden yellow	Dark blue
Gold	Golden yellow	or	Red	Gold
Scarlet	Red		Light navy blue	Scarlet

In order to eliminate this confusion, approval was granted on 24 Apr 1959 for the official inscription and precedence of RCEME distinctive colours to be;

Royal blue
Gold
Scarlet.

* At the time of writing, it would appear that this description is the most recent. This instruction was cancelled 11 May 1954 with the notation "Being incorporated in Provisional Dress Regulations". Unfortunately, Orders and Instructions for Dress does not cover corps and regimental ties. Thus it would appear, that in a technical sense, the RCEME tie is unauthorized.

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NEW WORKSHOP AID

Weld Help Kit

Weld Help Kits, as manufactured by Arcair, are to be provided to 202 and 204 Base Workshop, 205 Workshop and the RCEME School in the immediate future, to ascertain their usefulness and gain usage experience. These kits consist of a sample type package containing three 3-in x 6-in carbon plates of a thickness from 3/8-in to 3/4-in; eight 12-in carbon rods in diameter from 3/16-in to 7/8-in; a can of carbon paste, carbon soluble in water to produce a plastic compound; a can of Protex, protection compound and an illustrated manual.

The carbon plates can be used to form a dam within which molten welding rod may be contained. The carbon paste is a pliable material, which can be used in the same manner but for irregular shapes. The carbon rod can be threaded or filed or otherwise machined prior to being used to hold back molten metal.

Protex paste can be smeared onto a surface and protect that surface from welding splattes.

The kit as a whole cuts down the use of welding jigs and permits welding with a minimum of machining afterwards.

SAFETY AT 204 BASE WORKSHOP RCEME

All through the shop we hear this refrain,
"Let's all get together in the Safety Campaign,
An ounce of prevention is worth a pound of cure",
And it will make us happier, of this I'm sure.

From Len comes a shout that would wake the dead from their slumber,
"You must watch what you're doing when piling the lumber".
Then by the benches we hear as we pause,
"Be careful and don't feed your hands to the saws".

In passing Vehicles we should peek at the Body Shop;
Any carelessness here would make your eyes 'pop'.

In the Machine Shop, Al may stop to advise,
"Use those shields when grinding and keep both your eyes".

In Light and Heavy Components you hear this exclamation,
"You get more in your wages than in compensation".

While over in Welding you may hear a roar,
"Keep your hand behind the chisel and your blood off the floor".

While in Engine Line, Smitty there hoots,
"You guys got to get rid of those thin running boots".

To Transport, who travel, just this little thought,
The highways are crowded, but graveyards are not.

About those in the office, there's not much danger there,
Unless they doze at 'sleep break' and fall off the chair.

But to be safe and not sorry can't too often be said,
For you can't help your family, friend, after you're dead.

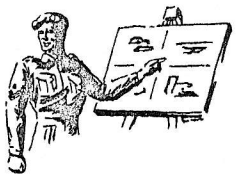
— The Poet Laureate of 204

If you're below the rank of WO1, this message is for you.

"You must polish the badge on your belt buckle"

With reference to Director's Letter No. 9, page 4, para 4, badges worn on belt buckles by ranks below WO1 will NOT be anodized or treated for non-tarnish, although the buckle may be.

PLANS AND TRAINING



By Capt JR O'Neill

Pre-artificer Assessments

Since the first of April this year a new system of pre-artificer assessments is being followed. It is hoped that this new system will save travel dollars, remove part of any psychological obstacle, and at the same time maintain the high standard of our artificer training program.

The aim of the pre-artificer assessments is to ensure that artificer candidates have sufficient academic and trade knowledge to enable them to absorb the instruction given on the artificer course.

This assessment and the artificer courses enable RCEME to produce senior non-commissioned officers and warrant officers who are experts in certain technical fields and who are able to assume their share of responsibility; responsibility for the conservation of equipment and material, the safety of others, the work of others in addition to their own work, the assignment of work and the instructing, training, and directing of others in their work. They require the initiative and ingenuity needed to originate, plan, and perform work of different kinds in the absence of standard methods, equipment, or materials. This latter attribute is especially vital in field operations where equipment, labor, tools or parts are temporarily not available.

The wastage rate on pre-artificer assessments at the RCEME School has been excessive in the past with the greatest part of this wastage taking place as the result of failures on the academic portion of the assessments. In order to eliminate the resulting unnecessary expenditure of travel funds, the method of conducting the assessments in April of each year will be by written examinations at command writing centers. The assessments on academic subjects and trade theory will be set and marked by the RCEME School. After passing this hurdle potential artificers will not be taken off the course unless they are unable to keep pace with the instruction given.

The training standards for these assessments were rewritten in 1959 to provide an academic standard common to all the mechanical artificer trades and another standard common to the electrical and electronic artificer trades. These standards in the form of a yellow booklet have been distributed to all RCEME units and also to candidates completing RCEME senior non-commissioned officer courses. Subsequently the text books used as reference material in these academic training standards were supplied to all RCEME units. The intention is that personnel will have ample opportunity to prepare themselves in advance for their assessments.

It has already been noted that some units are conducting organized study groups and that there is an improvement in the academic level of the candidates.

Past experience has shown that a man's initial educational level is not always a true indication of his academic level when he becomes eligible for artificer training. In a great number of cases personnel have upgraded

their educational level either through attendance at night school or by correspondence courses. Potential candidates should be reminded that assistance is available from the Department of Veterans Affairs in free correspondence courses for service personnel. These courses can be obtained through the Education Officer of their unit or formation. The services of personnel selection officers may be used to establish actual academic levels of candidates before the unit training program is begun.

In the interests of training and career progression, it is the duty of RCEME officers, warrant officers and non-commissioned officers to familiarize themselves with the contents of the assessment training standards. Although it is the responsibility of the individual to prepare himself in his trade and academic subjects for the pre-artificer assessment all possible assistance must be given to potential candidates. There is no doubt that the degree and efficiency of such assistance will be reflected in the results.

New Trades

Five new RCEME trades become effective in 1960:

Aircraft Artificer Group 4
Helicopter Technician Groups 2 and 3
Airplane Technician Groups 2 and 3
Weapons Artificer Group 4 (which replaces the trades of Armament Artificer and Small Arms Artificer)
Weapons Technician Groups 1, 2 and 3 (which replaces the trades of Gun Mechanic Groups 1, 2 and 3 and Armourer Groups 1, 2 and 3)

The candidates for the aircraft repair trades are being selected from vehicle mechanics wheeled and tracked and vehicle artificers. After a course on aircraft repair and a period of in-job training they are trade tested prior to remustering to the new trades.

Armament artificers, small arms artificers, gun mechanics and armourers will be sent to RCEME School to attend weapons conversion courses. On the completion of these courses they will be remustered to weapons artificers and weapons technicians. It is estimated that it will take three to four years to complete this conversion program. Conversion courses will run from seven to thirteen weeks. However units should start in-job training in these weapons trades as soon as the weapons artificer and weapons technician trade specifications are received. This will assist the personnel on their conversion course and may make it possible for some to qualify in their new trade by a trade test rather than by taking a conversion course. Personnel will be selected by Army Headquarters for conversion courses in order of rank, seniority and trade group. First, all the warrant officers will attend a one week assessment course; the other artificers and the tradesmen of lower groups will receive longer and more formal conversion training. The longer conversion courses are designed for those who are actively employed on productive work in the repair of weapons.

THE WHY AND WHAT OF SCALING

By Capt AM MacDonald

Introduction

The word "scales" should be familiar to all RCEME personnel since, as soldiers, they have been exposed to scales-of-issue since the day they enlisted. The words "scales" and "scaling" as used here are a little different from the familiar scales-of-issue produced by Ordnance; perhaps the biggest difference being that they are produced by RCEME to tell RCOC what we require from them in order to do our job. As RCEME documents they should be as familiar to us as the tools we use every day.

History of Scales

The history of scales dates back to the formation of REME in 1943. At the same time as REME was organizing their Scales Branch a British officer, who was sent to Canada for the purpose, began to organize a Scales Branch in Ottawa to produce British North America scales. These, of course, were to apply to CMP vehicles which would, in many cases, be used by British formations.

This activity ceased, in Canada at least, in 1945 and nothing further was done along this line until January 1950 at which time a Scales Group was organized at Army Headquarters. No establishment was set up, the necessary people being borrowed from various units.

The staff in the beginning numbered three officers and three other ranks, only one of whom had any previous scaling experience. During the Korean action the staff was increased to forty or fifty but this dropped to eight once the necessary scales had been produced.

This group was handicapped by their lack of authority and the lack of any directives to either RCOC or RCEME as to the purpose of the Scales Branch or the scales they produced.

At approximately the same time Command Scaling Teams were organized to write the scales for their Commands. This system did not prove too practical and the responsibility for scales reverted to Montreal and London where small scaling sections had also been set up.

The Necessity for Scales

The purpose of scales is stated in the notes at the front of every scales document. To rephrase it slightly, scales are written to provide RCOC with an accurate estimate of spare parts required to maintain a given number of equipments for a specified period of time or, to state it in its simplest form "to put the parts where they will be needed when they will be needed".

A more detailed definition, which is used by scaling personnel, is "to put 'on the shelves' 85% of the spare parts (in terms of both quantity and item range) that will be required in a given period plus a minimum quantity of such items of the remaining 15% whose failure would prevent operation of the equipment". The figure of 85% is a compromise between the ideal of 100% spares and the practical limits imposed by a unit's carrying capacity.

The necessity of carrying 'essential' items (those whose failure would prevent operation of the equipment) is one of the reasons why scales are necessary. Many systems have been devised to establish what parts should be held but, in the main, such systems depend on past experience or usage and, more important, on the rate of usage; usually using a specified number of issues in a given period as the basis for establishing stock levels. Such a system precludes the holding of slow-moving essential items and thus causes additional delay in the making of repairs.

Systems based on past usage experience can be termed statistical systems. To be accurate such systems must be based on a relatively long period of experience, not merely in the early life of an equipment but every time a new item is demanded. New items are being demanded throughout the life of equipments as the very slow moving items begin to fail. Such systems must also ignore temporary fluctuations upwards or downwards. Statistics alone, however, cannot tell initially if such fluctuations are temporary or permanent thus an increased usage over six or eight months can lead to increased stock levels which can become superfluous when the usage drops off.

Another factor to be considered is that as the number of equipments increases the apparent usage increases leading to the stocking of parts which would not otherwise be justified. This tends to increase the load on the units which must carry such spares. Scales, however, are written on the premise that a two-fold increase in the number of equipments does not necessitate a two-fold increase in the use of spares. This will of course lead to increased delay but it is felt that formations or units with large numbers of equipments can afford to have a greater number, though not necessarily a larger percentage, out of action. For very small holdings the reverse holds true. This principal explains why the 'ladder' used in Issue Scales increases the spare parts at a lesser rate than the increase of equipments.

Scales attempt to overcome the drawbacks of statistical systems, firstly, by eliminating the initial delay while experience is being accumulated. Indeed, the increasing pace of military operations has made such a delay unacceptable and this in itself can be considered the main reason for the development of the concept of scales. Secondly, scales forecast periods of temporarily high usage. Although the scales are written for a group of equipments of varying ages and the figures thus must represent an average, usage which appears low in the early life of such equipments can be ignored in the knowledge that stocks accumulated will be required at a foreseeable time in the future. Similarly high usages which have not been foreseen can be examined to ascertain the reason, and the causes can sometimes be rectified.

Processing of Scales

Users of scales documents very often see only one of a series of documents; thus it may be of interest to explain what documents are produced and how they are developed.

The first document produced may be an Initial Spares Schedule (ISS) which lists the parts which will be required to maintain the equipments usually for the first year. During this time a Provision Schedule is written which lists the spares which will be required to maintain 100 equipments for any given year. This document contains separate columns for war and peace, the latter column being labelled "Canada". It must be remembered that the 100 equipments are assumed to be an average group, that is, of varying ages. At this stage the equipments are all 'of an age', thus many parts, such as those usually replaced only during an overhaul, may not be required for several years. If, however, they are purchased every year they will be on hand when required.

When the Provision Schedule is completed it is reviewed by the Directorate of Cataloguing and Equipment Requirements (DCER) to ensure that the part numbers and nomenclatures are correct. Any new parts will then be included in the next edition of the Master Parts Catalogue. This will explain why scales are sometimes more up to date than the MPC.

The items contained in the Provision Schedule are then spread or allocated to Issue Scales on the basis of the Permissive Repair Schedule. Issue Scales (War) and Issue Scales (Canada) may both be produced; the war scales including Base, Field and LAD; the Canada including Field and Static RCASC Coy and LAD scales. (The Static RCASC Coy and LAD Scale is a combined document). In spreading, the quantities are adjusted to a 2-month period for Issue Scales (War) Base and Field and a 15-day period for the LAD scales. These periods double for Canada Scales.

There is no particular significance to these time periods; Canada has chosen them because both Britain and the USA use them. Two factors, however, may have influenced their choice. The period should be greater than the 'lead time' of the supply organization and secondly it should be short enough that the quantities do not overload the unit's carrying capacity. It will be noted that the Issue Scale (War) Field is unique in that most items show two rows of quantities. This is necessary because the field scale includes quantities for issue to LADs and to units as well as the quantities to be used by the field workshop. These scales are also used by RCASC workshops who do not have issue commitments and who do not draw from the field workshop. Issues to units are made on the basis of Canadian Basic Scales which, while they are issued by RCOC, are prepared in draft form by scales personnel.

Not all items appearing in Provision Schedules are spread to Issue Scales. Some, which are usually replaced during overhaul, are listed only in Overhaul Program Scales which are distributed to Base workshops. Other items, while being spread to Issue Scales, bear no quantities. These are known as 'per cent' items and bear the Symbol (%).

Per cent items are those whose estimated life is ten years or greater or, expressed in another way, items of which 10 or 10%, would be replaced in an average group of 100 equipments in one year. Items assessed at 11 to 15% are not given a quantity in an LAD scale but are in the Field scale from which the LAD draws its parts. None of this, of course, applies if the item is considered essential.

In Canada a different situation has evolved. The present policy places more emphasis on keeping stock levels down than on reducing 'down time' of equipments. To this end RCOC stock on the basis of usage. Even here, however, the scales play a part to reduce the initial delay which is inevitable in such a system. Canada scales show the symbol (#) against fast-moving parts, roughly those assessed at 80% or greater. These items are stocked initially and the remainder of the items included as usage warrants.

In addition to the aforementioned documents many Special Scales are produced for specific quantities of equipments and specific locations such as the Northwest Highway System and the Canadian Infantry Brigade Group (Europe). Scales are also produced for specific exercises.

Keeping Scales up to Date

In order to achieve maximum usefulness scales must be kept up to date. Quantities must be altered when usage indicates; new and improved parts must be included as they are developed; parts added by modifications must be included; changes made necessary by a change in repair policy must be made; and errors must be corrected when they are discovered.

To accomplish all these things the scaling sections rely on Spare Parts Usage Returns, Parts Change Bulletins, Modification Instructions, Permissive Repair Schedules and letters from any and all units advising of errors.

When a Spare Parts Usage Return is received the information is transferred to cards where it is compared to all other information previously received. It is then investigated to ascertain if the high usage is caused by some other factor and is not therefore indicative of an initial assessment error. If the figures tend to agree with one another and no local cause can be ascertained, an amendment is produced adjusting the scale figure.

Parts Change Bulletins are issued from AHQ and advise of new parts being substituted for old, or any other changes being made. When these are received they are examined to see if the parts affected are scaled parts and, if so, the changes are catalogued by DCER and an amendment prepared to the scale.

Modification instructions are received in draft form by the scaling sections in order that any changes made necessary by the instruction can be made to the scales as soon as possible.

Similarly, when a new Permissive Repair Schedule is received all scales affected are checked and any necessary adjustments made

by amendments.

One function which has not yet been mentioned is the up-dating of part numbers and nomenclatures. Although the Master Parts Catalogue (MPC) enjoys a wide distribution any changes made to part numbers or nomenclature are amended into the scales as quickly as possible to minimize the amount of searching which may become necessary if the scale and the MPC show different part numbers or nomenclatures for the same part.

Although not always possible it has long been the policy in scales to produce an amendment to the active scales no less often than once a month.

Summary

It is hoped that the foregoing will assist all RCEME personnel in understanding what scales are and what they are intended to do. In order to attain their maximum usefulness they must be used properly and kept up to date. All units using scales can assist greatly in this latter requirement by submitting Spare Parts Usage Returns as often as variations between quantities scaled and quantities used are noted. If in doubt as to the significance or the permanence of a variation, then submit a return; too many are better than too few.

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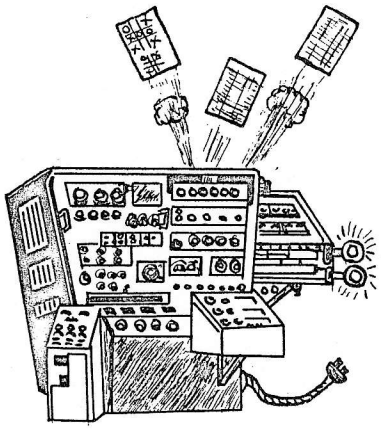

AUTOMATIC DATA PROCESSING

A MANAGEMENT TOOL

By Lt Col AG Sangster

To the layman, the terms "Automatic Data Processing" and "Electronic Data Processing", which are really synonymous, are often associated with magic and science-fiction and are accepted tolerantly because of the propaganda pressures in advertising telling us that this industry or that has switched to "Automation".

A surprising number of people today believe you can buy a "robot", "electronic brain" or call it what you will, and ask it questions and get answers. A machine is inanimate without any powers of interpretation, decision or communication until it is educated by the operator. It is an uneducated child with a vacant but receptive brain. Once educated by

the information fed in to indexed brain cells or memory storage, the machine will reproduce with uncanny accuracy the errors fed in by the operator and the cumulative errors acquired in the calculation process which has also been fed in by the operator. This means it is possible to get the wrong answer at the speed of light. Better still, it will give the right answer at the same speed if the basic information and processes were accurate.

How can this help management? Stick around awhile.

A child learns the alphabet and how to count from one to ten. As it progresses the letters form words and the digits form numbers. Later the words form groups and the numbers group into arithmetic, algebraic or other formations as the education progresses. They stop counting on their fingers and spelling out words and begin to take mental short cuts. So far we can teach a machine to do all these things. More and more that the human brain does can be duplicated by modern machines at electronic speed. Few if any of our best staff-trained officers can approach this.

What benefit do we get from using high speed machines? In a case under study it appears that a job taking 25 man weeks per year by clerical methods might be reduced to a matter of man days per year. At the clerical level this might be misconstrued as meaning "there goes my job." Far from it. What it really means is that at a policy level a warning of the need for management action is recognized six months earlier and longer range planning can be used. This could mean earlier warning of a posting or adjustments to establishments either up or down.

How does this apply to RCEME? Stay with it.

In RCEME we have two major reporting systems: (a) the accounting copy of the 2149, and (b) the time accounting return.

The accounting copy of the 2149 results in the national average work content by trade for each coded equipment in use by the Canadian Army. The monthly runoffs also spell out the performance of each RCEME unit. The workshop commander, of course, is interested in how he stacks up against the national average and if he deviates, why? When he deviates, his management action is to find out the cause and make the necessary corrections locally. For a fixed workload, he has too many or too few men; they are faster or slower in repair; his men are untrained or proficient; as compared to national averages.

The time accounting return has probably puzzled and annoyed many people. Its most important role is to tell a workshop commander how effectively his men are employed and in what way the ineffective time is being lost. Without this knowledge a workshop commander cannot know what corrective action to take. Again he is interested in national averages as a means of assessing local performance so he can take management action if necessary or feasible. So you submit copy 4 of the 2149 and the time accounting returns! What happens? Be patient - all will be told!

Let us now go back to the infernal machines. When the copy 4 of the 2149 arrives at DEME it is checked for obvious errors or omissions and where possible corrected. Where impossible, it is referred back to the originator for verification or correction. It then goes to a Key Punch Operator where the key information is transferred to punched cards. A second operator then verifies the punched cards by machine which reduces the punching error to a negligible minimum. From this point on, all processing is done by machine and human errors are eliminated. Machine errors only occur in the development and proving of a machine program. Once developed and proven, the control panel is sealed and further errors can be traced to the originator of the document processed.

The time accounting return will be processed by machine in the near future. It is being revised and simplified to ease the clerical load on workshops. Again the main value will be in getting national information earlier than could be done by clerical methods. At present the AEC assumes that a soldier is effective 100 hrs per month and a civilian 130 hrs per month. With the new reporting system we will know not only the national average figures but the local weighting factors for individual workshops. Eventually it is planned that establishments can be reviewed by machine in the light of known workloads, local weighting factors, and other factors as laid down in the staffing guide. It is also planned that in future machine runoffs will review a 12-month period to compensate for seasonal fluctuations.

Going back briefly to machine capabilities, the machines are only capable of making decisions between two alternatives - yes or no - zero or non-zero - something or nothing. The programmer must be able to reduce the decisions to a two-alternative form, eliminating one after the other of the undesirable alternatives in succession. In planning machine programs the time unit used is the millisecond and many steps are so fast they can be considered to be instantaneous. Thus electronic machines can carry out arithmetic and algebraic computations many times faster than a human brain in spite of the mental short cuts a human brain can learn. Where will it lead us in the future?

For those who may be alarmed at the possibility that machines may take over, think about the overpopulation forecasts. Except in the scientific fields, a machine can be replaced by enough people - if there is little or no urgency.

Take it from there and think.

RCEME PARTICIPATION IN THE LACROSSE TRIALS

By Capt GN Brent

Cold weather trials on the Lacrosse (SSM) Guided Missile were originally scheduled for the Winter of 58-59 but due to many unforeseen difficulties had to be cancelled. They were subsequently held during the period 3 Jan - 24 Feb 60 at Fort Churchill, Man.

Early in the planning for the trials it was decided that the trials would be a combined US - CDN project. Hence RCEME personnel were selected for Lacrosse training and proceeded to the Ordnance Guided Missile School at Huntsville, Alabama, early in 1958. They were trained in all aspects of maintenance and repair of the missile system.

On completion of the technical training in the Fall of 58, the RCEME five-man team proceeded to Fort Bliss, Texas, and became an integral part of the trials' team then being assembled. They were attached to the US Army Ordnance Direct Support Detachment which had been charged with the responsibility of supporting the trials. In all later operations RCEME and Ordnance worked together. On the operational side, the team consisted of personnel from RCA, US Army, and US Marine Corps.

Little need be said here of the difficulties encountered during this training period. Suffice it to say that the trials were subsequently cancelled for one year. As a result, the team was reassembled at Fort Bliss in Oct 59 to undergo refresher training. This training was successfully completed by mid-December.

For the trials, all of the team assembled in Fort Churchill on or before 3 Jan 60. A short period of time was required to equip personnel with arctic clothing, to draw equipment or unpack that which had been brought in by the team, and to get settled. During this period, RCEME first established liaison with the CO of 18 Coy RCEME and the OIC of 223 Workshop RCEME. They then assisted the workshop in installing communication equipment in several of the trials' team vehicles. At the same time, the Ordnance personnel were setting up the repair facilities. The accommodation provided was in the "Frost Jet" area, some eight miles from Fort Churchill. This consisted of a large well-heated and well-lighted building. Generators were installed to provide the 60 cycle and 400 cycle power requirement. In addition two marquees were available for outside shelter and working area, which was also used as the assembly and check-out area by the operational crews.

A system of operation was established immediately. RCEME or Ordnance personnel always attended the check-out of the missile by the operational crews. This meant that they were available to give technical aid immediately difficulties were encountered and to accept the repair responsibility once it was apparent that it was beyond the scope of the user. This system worked well as it prevented duplication in fault diagnosis, and the same system was followed at missile firings. Repair personnel were always available and much valuable time was saved.

The major item used in trouble-shooting the missile proper was the Guided Missile Test Set. This facility is a component part of the self-propelled launcher and is used by both operators and repair personnel. It is semi-automatic in operation and checks forty-two circuits within the missile. If a fault occurs during check-out, the test set indicates, after a series of tests, whether the fault is within the missile or the test set.

The majority of the trouble-shooting on the Missile Guidance Central or Ground Station was done with test facilities incorporated within the system. It was common practice for RCEME and Ordnance to complete third and fourth echelon checks on this portion of the equipment prior to each firing. This part of the equipment proved to be the most reliable. However, two man-made faults caused many anxious moments and long hours of work.

Very few problems were encountered during the cold weather trials that had not occurred during the training periods in Fort Bliss, although it was found that RG-58 coaxial cable was not designed for rough handling under arctic conditions.

RCEME and Ordnance were not able to completely carry out their repair mission due to lack of test equipment. In all, some twenty pieces of test equipment, special to Lacrosse, had been designed and produced in small quantities. Of these, only two were available during the period of the trial, resulting in much of the repair being done by replacement of complete chassis. The non-serviceable chassis were returned to the US for repair.

The RCEME personnel soon established a reputation of jack-of-all trades and were looked to for repairs which would normally have been done by the resident Ordnance Workshop at Fort Churchill. In this respect, it must be stated that the support and cooperation of 223 Workshop at all times was excellent.

The Lacrosse was the first surface-to-surface missile trial on which RCEME has participated. All personnel gained much experience in the missile field and profited by their association with the other units of the integrated trials team.

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BATTLEFIELD SURVEILLANCE RADARS FOR THE CANADIAN ARMY

By WO1 CG Sherman

Lightweight terrestrial target locators utilizing radar principles are required by the Canadian Army for battlefield surveillance. The equipments must be portable (or at least transportable) and manufactured so that assembly and disassembly can be carried out under battlefield conditions by relatively technically unskilled infantry soldiers. They must be capable of detecting moving targets in the presence of ground clutter and possess sufficient range to cover extended frontages and gaps between organizations.

To minimize repair and adjustment problems the detector should be extremely rugged and incorporate circuitry which requires a minimum number of operational controls and adjustments.

A number of equipments, both portable and transportable, are under consideration but up to the present only one has been definitely accepted for army use. This is Radar Set AN/PPS-4 which is presently being produced by a Canadian manufacturer and should reach units in the field by late 1961.

The radar is constructed in the form of a cylinder approximately 14 inches in diameter and 14 inches in length. An antenna and parabolic reflector are located at the front of the cylinder with the control panel and indicators at the rear. The complete assembly is mounted on an adjustable tripod which is fitted with a pivotal mounting to permit horizontal and vertical movement of the antenna system and cylinder. As the radar is transistorized, special nickel-cadmium batteries can provide all the primary power that is needed.

Total weight of the equipment is approximately 100 lb including batteries and carrying cases. Man-portability on the battlefield is normally accomplished by distributing the load on three standard pack boards.

Moving targets such as vehicles and personnel can be detected in the midst of clutter produced by stationary objects by utilizing the 'doppler effect' ie, an apparent frequency shift that occurs between the transmitted frequency and that reflected from the target when the target has radial velocity. The resulting difference frequency when applied through suitable circuitry produces target signals which are indicated aurally in headphones supplied with the radar.

REPAIR OF EQUIPMENT WITH RADIOACTIVE LUMINOUS MARKINGS

Based on a paper by Capt DM Maher

Luminous paints constitute a hazard to health because, as they age, they 'chalk off' in very minute particles not visuable except under ultraviolet lighting. Luminous compounds use RA226, an alpha particle emitter having a half-life of 1620 years, as the radioactive element.

Radiation from a source deposited within the tissues of the body has the same biological effects as external radiation but it is much more difficult to measure. This type of radiation includes alpha particles with 10,000 times the ionizing power (hence the danger) of gamma photons. During repair of equipments the minute particles of paint may drop off and become an inhalation or ingestion hazard. Unfortunately radium, when it enters the body, is mainly deposited close to those tissues where it can do the most damage. It is removed and excreted very slowly. Its long half-life means that the radiation remains almost constant while it is in the body, and even a minute quantity of radium can do much damage over a period of time.

This type of radiation can be assessed in an individual by measuring the daily urinary excretion of radioactive substances, as this reflects the amount remaining in the body. This process is called bio-assay. While no amount of radium or any other alpha emitter is ever considered tolerable, a maximum permissable level of 0.1 microcurie has been tentatively assigned. It is estimated that this amount will not cause noticeable ill effects and, for lack of any other medical standard, it is upon this level that the danger must be judged.

Contamination was observed in 1957 in 202 Base Workshop. Detection was by means of a 100 watt ultraviolet lamp and an alpha counter (scintillometer). The contamination was found over the area of the instrument shop where luminous compasses and watches were repaired, indicating that airborne contaminate was present.

Mechanics were immediately evacuated from this area and given bio-assay tests, seven showing definite traces of radium but none beyond the 0.1 microcurie body tolerance. Decontamination crews were equipped with protective clothing and respirators and put to work cleaning this area of all contaminate. Tools were cleaned by means of water and detergent agitated by air. The rooms, benches, and machines were cleaned by brushing, scrubbing, and scraping. It took about five weeks to clean this area, working two crews of eight men each.

Repair work on luminized items was stopped to allow investigations to be carried out to see how this type of work could be done safely. During the next year the development of the Armed Services "Kit, Radiation, Detection and Decontamination" was accomplished. The chief item of the kit is a cabinet which:

a. Provides both white and ultraviolet light, with the ultraviolet lamp so situated that the item can be brought within 2-in of

the source, while protecting the operator's eyes from direct ultraviolet rays.

b. Provides an up-draft 0.3 micron filtered exhaust system, regulated so that the airborne particles are a minimum but that no spills occur at the operator opening.

c. Provides a sump for a cleaning solvent for wet decontamination of the cabinet itself.

d. Provides sufficient work space.

e. Is capable of being used anywhere without interfering with the surrounding area.

f. Has a disposal facility for containers, etc.

The exhaust system of the cabinet precludes the necessity for the operator wearing a respirator, but the kit also provides protective overboots and apron. In addition, a 110-watt portable ultraviolet lamp enables frequent monitoring of the area where this type of repair is being carried out. The cost of the kit and all its accessories is approximately $300. The photographs show, Figure 1 - the general appearance of the cabinet, and Figure 2 - a mechanic using the cabinet.

To strip items of luminous paint so that refinishing is possible, it was necessary to design a much larger version of the cabinet contained in the kit. This large cabinet incorporates a much larger light source and is made so that when its doors are closed it is completely sealed and the operator works through armlets and rubber gloves. The unit incorporates an automatic flushing system, all light and pump controls are foot operated, and a special stripping solvent and operating technique has been developed.

A further problem is that some equipments are too large to be decontaminated in a cabinet and in this case the work must be done in a controlled area. The area must be draft free and the decontamination crew must wear protective clothing including respirators. The equipment is stripped and as each subassembly is taken off, it is passed through a cabinet for decontamination. The area becomes contaminated to a degree and is cleaned at least once a day. A proper clean dressing area must be provided for the mechanics.

Through all these procedures a very strict control of personal hygiene must be maintained. This is perhaps the most valuable safeguard now known.

A submission has been before the AEEC for over a year for 16 Kits, Radiation, Detection and Contamination, to be used in the various static workshops responsible for instrument repair. All the problems concerning these items appear to have been solved and the main committee of the AEEC is expected to approve the item during April 1960.

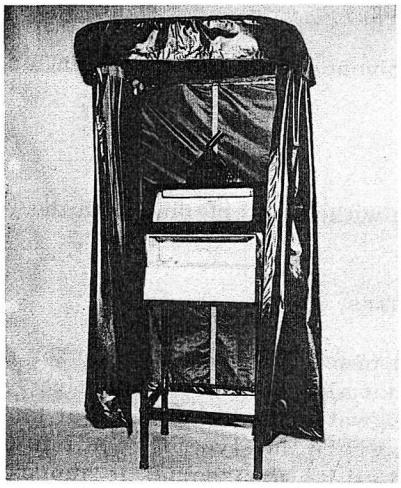


Fig 1

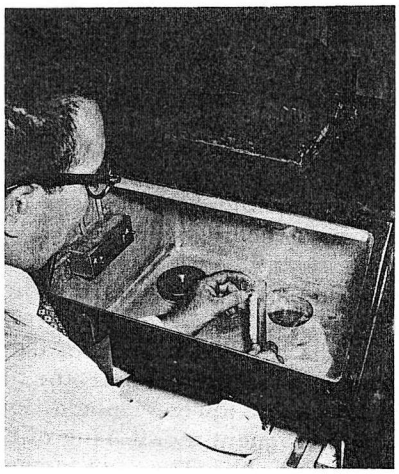


Fig 2

WORKSHOP AID

Distilled Water

Distilled water for use in battery shops, instrument shops, etc, has in the past been obtained as an expendable store through RCOC, usually in a carboy. This carboy was reasonably difficult to handle and replenishment of the water was not always as immediate as we would sometimes have liked it.

A throw-away cartridge to permit de-ionization has been developed which produces from tap water the equivalent of the distilled water we have had in the past.

A hose leads from the top of the cartridge to the water tap and distilled water flows out of the bottom at a rate of approximately 5 gallons per hour.

When the cartridge requires replacement, a dyed resin incorporated in the cartridge produces a change of colour in the water output, indicating the need to change the cartridge.

Entitlement is to be sought for all workshops or the SPSS for a wall bracket to hold these de-ionization cartridges, and a supply of the cartridges themselves as an expendable item. These cartridges are known to last approximately 100 hours with a water hardness of 9 grains (Ottawa water).

TOOLING FOR RCEME WORKSHOPS

INTRODUCTION

In this and subsequent issues of the Technical Bulletin will be a series of articles on tooling and technological developments, based on a talk given by Major Jack Whittingham to the Intermediate EME course at the RCEME School in early 1960. This is the first in the series and covers aspects of needs, entitlements, and replacement. Subsequent issues will deal with a review of tool evaluation as it concerns our workshops.

TOOL DEVELOPMENTS IN RCEME WORKSHOPS

By Major JW Whittingham

The Need

Everyone will agree it is essential that we have the tools and machinery to carry out the repair mission of RCEME workshops. It is not necessary however that the unit should have everything shown in its entitlement documents, if there is no specific use for these items. This is particularly true in the case of machine tools, and the tools provided are to:

a. perform machine tool operations required by the repair work of the establishment;

b. maintain and extend the trade skills of machinists, gun mechanics, instrument mechanics, and armament artificers on the strength of the workshop;

c. make available the tools on which trade tests can be carried out.

These factors should not be forgotten when determining the need.

It is the duty of every officer, warrant officer, and NCO, and particularly that of the CO, to balance the necessity for tools against the needs and make sure unnecessary items are not held. The more tools and equipment held the greater the financial responsibility, maintenance, and administration.

New Tooling

Although we must therefore keep our tooling to a minimum, submissions (CAO 97-1) should not be cut off entirely. Workshop personnel must be encouraged to keep abreast of changes in tool developments and to draw them to the attention of their superiors. NCOs should stress to tradesmen that they must not be afraid to ask for an item that they consider will do the job better than the tool they now have. It is far better to carry out an investigation and then refuse the item than to stimy progressive thinking.

To assist in 'tooling up' for various jobs a subsection exists within DEME known as Maintenance Techniques Section (MTS) with subunits at 202 and 204 Base Wksps. This organization constantly probes into the field of technical developments with a view to improving methods and techniques of repair, proving modifications, determining requirements for special jigs and tools, establishing engineered time standards and various other operations of a similar nature.

In addition new tools are drawn to their attention from RCEME units across the country, and industry produces and demonstrates tools and equipment superior to those we have been using. These tools may save money, look better, be safer or perform a better job; however, it is necessary to prove the actual saving before entitlement can be obtained.

Along with entitlement we must also obtain money, and a lead time of up to two years must be expected from the demonstration of a tool to the time it is actually procured. As an example estimates are made up in spring and go through many screening committees before final submission. Those for the budget just recently passed were calculated early in 1959 to meet the 1960-61 requirements.

Once a decision to obtain a tool has been made it is stressed that not only the savings of the tool itself but the method of its employment has been investigated thoroughly. In addition a workshop trial has usually been held and if the item is a major piece of tooling our Director will have reviewed the need personally.

It is unfortunate that in the past the first intimation that a new tool was to be issued to a workshop was an Issue Order from RCOC. Unfortunately, too, it is quite common that the nomenclature may bear very little resemblance to the tool function. It is no wonder, therefore, that requests are frequently received from workshops to cancel the Issue Orders before these automatic issues can be made.

'Description Sheets' are now sent out to all units about to receive a new tool, showing the use of the tool, the trade name, sizes, electrical requirements, etc. Usually this Description Sheet has with it a covering letter stating that the item will be installed and will be used for the method described, as this has been determined as the best method to carry out a specific repair function.

Replacement

Much of the tooling in our workshops was becoming antiquated, and replacement items coming from depots in some instances was in the same category. Approximately a year and a half ago DEME and DOS started a program to segregate the hand tool stocks held by 26 COD into a. those items which should continue to be issued, and b. those items that should be disposed of, and generally speaking, to resolve the problem of unsatisfactory 'in lieu' issues of hand tools. It is only recently that the last items were physically segregated from this depot stock, and it will be some considerable time before the unsatisfactory items are disposed of entirely.

Along with this segregation of hand tools it was decided that 26 COD would issue complete tool kits only and that RODs would issue individual replacement items. Inspection teams are responsible for maintaining a close check on tool replacements and it is particularly important that they reject unsatisfactory tooling before it can get into depot stocks. Otherwise our tool kits will continue to be partially filled with unsatisfactory hand tools.

A similar program to that carried out on the hand tools is now taking place at 25 COD with respect to machine tools. Those items that are to continue in service will be rebuilt to a Schlesinger standard or better. In future therefore major items of machine tools issued from 25 COD should be new or in new condition. Finally a program of segregation will be applied in 27 COD to major items of automotive tooling.

Inspection and Registration

An inspection section for major items of tooling now exists within DEME. This subsection has prepared inspection test sheets for many of the major items of tooling. These are forwarded to workshops on request and may be attached to and support a Provisional Condemnation Certificate for any machine considered unsatisfactory by workshop personnel. It could be that a machine would be unsatisfactory for one workshop or one function within that workshop but might well be used for many years in another location or for another function.

Workshop personnel should be alert to the need for replacing workshop tools. This replacement of tooling differs somewhat from new tool requirements in that funds are included in estimates each year to provide for replacement of a fixed dollar value of tooling based on DEME records of age and condition. However, this figure can only be accurate if each individual responsible does his part thoroughly in the inspection and registration of the various tools.

WORKSHOP AID

Victoria U2R Milling Machine Traverse Modification

Difficulty has been experienced in a number of workshops with the power traverse mechanism in the Victoria U2R Milling Machine. This machine uses a chain drive connected directly to a positive dog-type clutch and the action of this has caused stripping of gears, shearing of pins, breaking of chain, blowing fuses and damage to the micro switches themselves.

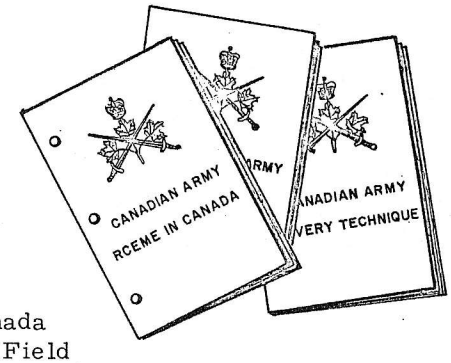
The B Elliot Co has designed a new friction disc clutch, now available as a modification kit. It has been successfully installed in two machines at the RCEME School.

Detailed instructions and drawings are being prepared and Ordnance have been asked to provide and distribute fifteen of the new clutches to various workshops across the country.

It has already been found, however, that individual fitting of each machine will be necessary. So, although drawings will detail the general installation, the fitting of the item itself into the body of the machine may require some adaptation by the artificers doing the installation.

RCEME CORPS DOCTRINE

A great deal of the RCEME doctrine contained in EME Manual General C 101 and C 102 and CAMT 11-1 Basic Organization and Role is out of date. These instructions and this pamphlet will be replaced as time permits by a new series of training pamphlets:



CAMT 11-1 RCEME in Canada
CAMT 11-2 RCEME in the Field
CAMT 11-3 Command of a RCEME Field Unit
CAMT 11-4 Recovery Technique
CAMT 11-5 RCEME Terminology

The RCEME section in CAMT 1-34, "Organization and Administration in Canada in 1960", has been completed and we are now awaiting the publication of the revised pamphlet. Our new CAMT 11-1 will be based on the RCEME section in CAMT 1-34.

At present CAMT 1-8, "The Infantry Brigade Group in Battle", is being completely rewritten to reflect current doctrine and equipment and will consist of two parts. Part I, numbered CAMT 1-8, will be concerned mainly with the tactical aspects of battle and Part II, numbered CAMT 1-11, will be administration. The RCEME chapter in CAMT 1-11 will consist of approximately 12 pages.

In addition to CAMT 1-8 and CAMT 1-11, each corps is writing a companion pamphlet and our contribution will be CAMT 11-2, "RCEME in the Field". These three pamphlets should be ready for distribution by September 1960.

Discrepancies in Parts Numbers in the EME Manual

For various reasons parts numbers on an equipment are sometimes changed. This may happen after an instruction has gone to the field. It is not the policy of DEME to reprint an instruction for this reason EXCEPT in the Data Summary. In other words we will try at all times to have the Data Summary correct.

The Radiacmeter, Gamma Survey, IM 108A/PD is a case in point. EME Manual G430 is being reprinted to reflect a change in part number but G432 will show the original number.

AVIATION EQUIPMENT

Technical Information

Much of the technical information pertaining to aviation equipment is being issued through EME Manual channels. Distribution of these instructions is being kept to a minimum because of supply problems of binders and related publications.

Many instructions in the Aviation Equipment EME Manual Part will consist, basically, of RCAF Engineering Orders. These engineering orders (instructions) do not fit the standard EME Manual binder. A new type binder, similar to that used by the RCAF, is being procured and may be demanded through RCOC by units who receive EME Manuals "Aviation Equipment".

This binder has been catalogued as 7510-21-102-2336 Binder, loose-leaf, C16, 8 1/2 x 11-in, side opening.

Users of the Aviation Equipment Part instructions are advised to study the forthcoming A 002 which explains the use of categories (xy0, etc) peculiar to the Part. Due to factors inherent in all aircraft operations, it has been necessary to deviate somewhat from the use of categories as laid down in GENERAL A 003. Some of these factors are:

a. Inspections (daily, weekly, etc). These form a vital part of aircraft maintenance and must be emphasized far more than is necessary for the customary RCEME inspection of other types of equipment. Inspection instructions will be published as xy5s.

b. Weight and balance data are critical in aircraft operation. Hence these instructions are alloted a category (xy8) not applicable to other EME Manual Parts.

c. Base repair of aircraft will be performed by manufacturers or other civilian agencies. The (xy4) category as used in Aviation Equipment Part is therefore not reserved for base repair information.

ELECTRICAL

RCEME Participation in SS-10 Missile Trials

The first operator's course on the SS-10 Anti-Tank Guided Missile was conducted at the RCAC School in Camp Borden during the period 21 Sep - 6 Nov 59.

14 Coy RCEME was charged with the responsibility of providing maintenance and repair facilities; and Fire Control System Artificers and Technicians from DEME, the RCEME School and 206 Workshop were attached to 14 Coy to provide additional support and allow as many tradesmen as possible to gain experience.

Many equipment faults developed during the course, most of which were cleared by RCEME personnel at unit level. Non-standard components presented the greatest difficulty and few spares were available for these items. Substitution was difficult and sometimes impossible.

Replacement fuses, a tester for checking the missile batteries, and a special panel for charging nickel-cadmium batteries, were manufactured by 14 Coy prior to and during the course.

Adoption of the SS-10 or SS-11 should create no new maintenance or repair problems providing spare parts peculiar to the equipment are available.

Radio Set C42

Old faithful, the No. 19 Wireless Set, will soon be turned out to pasture. Many will be replaced in the near future by the more sophisticated Radio Set C42.

The C42 is a VHF/FM voice transmitter/receiver with a nominal range of 15 miles. It is designed for operation in both AFV and wheeled vehicles but can be easily dismounted and used as a ground station. It will be used primarily for intra-unit radio communication.

Instructions will be published for this equipment: Data Summaries on the radio set, power supply, and harness will be distributed during the Spring; the Technical Descriptions in the Summer, and Permissive Repair Schedules will be published during the Fall. Work has also started on the development of Adapter and Installation Kits, and it is hoped that instructions for these will be available concurrent with the receipt of radio equipments.

The Radio is constructed in 'book' form, the main chassis folding outward to provide easy access to the subassemblies on the main frame. Although most components are not visible, terminal strips on each subassembly and on the main frame provide convenient test points. The receiver is used during transmit to provide AFC and true sidetone. This, coupled with a built-in crystal calibrator, provide the set with good self-test features. The design, construction, and high grade

components should result in good reliability and relatively easy maintenance.

Unlike the radio set, the construction of the power supply contributes very little to ease of maintenance. The circuit design includes many control and protective circuits, adding to the circuit complexity. The most prevalent fault in the equipments presently in use has been vibrator failure.

Two harnesses are used with the C42, an "A" type for AFV and a "B" type for wheeled vehicles and ground station. These provide far more facilities than No. 19 set installations. Consequently, the circuitry is fairly complex and includes several relays, switches and potentiometers. However, special test equipments have been designed, and will probably be purchased to simplify fault-finding in complete harnesses and harness components.

Nickel - Cadmium Batteries

Nickel-cadmium (ni-cad) batteries are now in limited use, eg, in the emergency firing circuit of the Centurion tank and in some experimental roles. It is expected that more general use will be made of this type of cell in the near future, particularly as a rugged, low temperature, rechargeable power source for electronic equipments. This will naturally introduce some battery shop problems peculiar to the ni-cad battery. When more definite information on the types of batteries to be used becomes available, DEME will amend the battery portion of the EME Manual. In the interim, manufacturers' instructions will have to be followed with care, and any specific problems referred to DEME.

Battlefield Surveillance Radar

Several battlefield surveillance radars are under consideration by AHQ and procurement has been initiated for the AN/PPS-4, a relatively small man-pack set which will operate from a transistor power supply. The batteries will probably be nickel-cadmium.

The repair problems are under consideration and it is probable that some radar and/or fire control systems personnel will undergo training in the near future.

Adapter, Test Kit, Electronic Equipment

This adapter test kit is now on distribution to units and preliminary comments have been favourable. In-case testing procedures are being rewritten for the CPRC-26, AN/PRC-509, and 510. Consideration is being given to modifying the kit to enable the C42, C45 and possibly the B47, B48 radio sets to be included in its facilities.

Electrically-Controlled Mechanical Targets

The repair responsibility for the electrically-controlled mechanical target has been transferred from RCE to RCEME. At present there are approximately 400 battery-controlled models in use. These are

located at Borden, Petawawa, Valcartier, and Sarcee. These older models will be replaced eventually with an AC operated model which will become the standard item. Until this new model appears the targets now in use will be repaired in the normal manner using local purchase of parts; any special problems should be referred to DEME.

AT LAST - A Tube Manual in the Library

Because of numerous requests for a tube manual, it has been decided to include the 11th edition of the Sylvania Technical Manual in the standard RCEME library. This is a loose leaf publication which is maintained up to date by supplements. The manuals will be purchased in bulk and distributed by AHQ. Workshops must then complete the post card included at the front of each manual and forward it to Sylvania Electric Ltd. This will place them on the Sylvania mailing list for supplements for two years. At the end of two years, the manual will be maintained by subscriptions for supplements by AHQ.

SMALL ARMS

Rifle 7.62 mm FN C1

Pierced primers and broken firing pins continue to present a problem. Investigation is being carried out along several lines and it is hoped that a solution will be forthcoming in the near future. It is requested that all failures continue to be reported.

The trigger pressure on rifles used for competitive shooting may be reduced to a minimum of 6 lb. The blade thickness may be reduced to .051 - .003-in. Details are included in EME Manual Small Arms C819 Instr 5.

Rifle 7.62 mm FN C2

Several reports have been received of the pin assembly link bending or breaking, causing difficulty in the removal of the pin. New pins are now being case hardened which should overcome this defect.

Gun Submachine 9 mm C1

EME Manual instructions have been prepared covering all known aspects of the weapon: Small Arms D110 and D112 have already been issued and D113 should be issued not later than 13 May 60.

Full size prints of Fig 2, 4 and 5 of D112 will be made available for instructional purposes on request.

Trouble has been experienced during endurance and acceptance trials with weapons firing more than one round with the change lever placed at 'R' repetition. This defect will probably be found to be more prevalent in weapons with serial numbers below 0S6000. If this condition cannot be overcome by repair methods outlined in EME Manual

Small Arms D113 Instr 1, the weapon should be the subject of an Equipment Failure Report.

New Tooling

Several new tools for repair of C1 and C2 Rifles and the Gun Submachine 9 mm C1 have been designed and action is being taken to secure appropriate entitlements. The tools will probably not be available before the early fall.

Listed hereunder are the tools and their uses:

Holding Tool, 9 mm plunger strut; for removing and replacing components of the strut butt and plate butt of the SMG 9 mm C1.

Holding Tool, cartridge extractor 9 mm submachine gun; for removing and replacing the extractor, plunger and spring.

Remover and Replacer, flash eliminator 7.62 mm.

Scraper, carbon rigid 7.62 mm Rifle; for removing carbon deposits which form between the washer flash eliminator and the end of the barrel, without removing the flash eliminator.

In addition to the above tools, mandrils for the repair of all types of magazines for the C1 and C2 Rifles and the SMG 9 mm C1 have been designed, and manufacturing drawings are being prepared. The mandrils will probably be issued on a limited basis because of their weight and cost.

VEHICLES

Replacement of Torque Rod Pin Dust Seals

Some SMP vehicles have rubber dust seals on the torque rod pins, which have deteriorated in storage. After investigation it has been decided that the extra wear resulting from the damaged seals is not sufficient to warrant replacement, except when torque rods are removed for other repairs.

Replacement of Vehicle Wiring

Numerous cases of deterioration of SMP vehicle wiring insulation have been received. After investigation it has been decided to coat all replacement wiring prior to installing on the vehicle.

In future all wiring, harness or open stock, drawn from RCOC will be coated with 1H 309155, preservative, coating, rubber, (20-GP-11). EME Manual Vehicles A 354 Instruction 9 covers the methods of application. Dipping is considered the most efficient method of applying to wire.

who's where

BRIGADIER

JW	Bishop	Comd HQ BC Area

COLONELS

RA	Campbell	DEME	EC	Mayhew	DDD
JR	Dunlop	CALE	KH	McKibbin	Adm HQ 4 CIBG
RL	Franklin	Chief Superintendent ADE	A	Mendelsohn	UNMOG (India and Pakistan)
CW	Jones	CO 202 Base Wksp	RH	Ramsay	Commandant, The RCEME School
WS	Hunt	MA Belgrade			

LIEUTENANT COLONELS

VW	Bethel	Br of GS (DSO&P)	CG	Kirby	10 Coy RCEME
GW	Bruce	DEME	GT	Kirk	HQ RCEME Eascom
DA	Campbell	DEME	AHR	Lewis	HQ RCEME Quecom
GG	Cavaghan	MCCD Vietnam	AL	MacLean	Cdn Army Staff College
EW	Coleman	DEME	IM	McLaughlin	Cdn Arsenals Ltd
WM	Dalrymple	204 Base Wksp	A	Miller	ADE
CMR	Elmsley	DEME	WJ	Owens	ADE
H	Goodfellow	HQ RCEME Wescom	AM	Reid	DEME
HW	Hagey	DDD	HM	Robinson	DEME
WG	Hamilton	HQ RCEME Cencom	AG	Sangster	DEME
RHC	Hodgson	DEME	GW	Thompson	CAS(Shape)
			KR	Ward	CAS (W)

MAJORS

J	Adams	CAS (W) (Detroit Arsenals)	RF	Fendick	Cdn Army Staff College
RW	Anderson	1 Coy RCEME	RK	Fulford	Dept of Defence Production
RA	Auckland	3 Coy RCEME	JJ	Garnett	HQ RCEME Eascom
HC	Banham	RCEME School	WH	Glover	3 Fd Wksp
W	Beddard	204 Base Wksp	RE	Hallam	4 Coy RCEME
CH	Betts	18 Coy RCEME	EJ	Hare	8 Coy RCEME
EP	Bishop	Dept of Defence Production	EJO	Harvey	DEME
JC	Boughton	DDD	TR	Heal	CALE (UK Exchange Offr)
JH	Bourne	202 Base Wksp	EF	Hendricks	CALE (UK Exchange Offr)
WJ	Branston	13 Coy RCEME	EC	Ilott	DEME
EM	Brignell	202 Base Wksp	AJ	Jeffery	5 Coy RCEME
H	Brown	RCEME School	FG	Johnson	CAS (W)
DD	Campbell	7 Coy RCEME	EG	Jones	DWD
DG	Carlyle	DQMG (D&D)	FR	Kaye	16 Coy RCEME
HL	Cohen	6 Coy RCEME	DT	Kennedy	Inspection Services of Cda
EW	Cole	204 Base Wksp	VD	Kenyon	CALE
KF	Collins	Br of GS (DED)	HLM	King	ADE
JH	Coombe	DEME	JS	Kitto	RCEME School
FE	Cooper	CALE (UK Exchange Offr)	RC	Lane	ADE
F	Coultish	D Pers	CG	Lawrence	7 Coy RCEME
KLF	Coupland	RCEME School	JL	Loughridge	13 Coy RCEME
BB	Cox	DEME	LH	Love	2 Fd Wksp
JC	Currie	HQ RCEME Wescom	RL	MacDonald	202 Base Wksp
BM	Deibert	202 Base Wksp	ALD	MacDonnell	7 Coy RCEME
FL	Demone	DEME	JH	MacLean	ADE
MA	Dolan	DDD	AGM	Maitland	6 Coy RCEME
	Ellis	2 Coy RCEME	RD	Maybee	RCEME School
RHE	Erb	RCEME School	HE	McLaughlin	DEME

H	McManus	11 Coy RCEME
GP	Miggins	12 Coy RCEME
KL	Murray	10 Coy RCEME
JN	Pinder-Moss	ADE
PLW	Platt	Defence Research Board
HF	Protheroe	1 Fd Wksp
CG	Provan	Incr 'B' HQ 4 CIBG
CG	Racicot	14 Coy RCEME
RC	Rivers	HQ RCEME Quecom
ANP	Roberts	DEME
M	Ruscher	HQ RCEME Cencom
IC	Scarlett	204 Base Wksp
FJ	Sergi	DDD
JP	Sherren	DEME
JL	Sloan	ADE
SG	Tait	202 Base Wksp
AR	Thomsen	204 Base Wksp
DJ	Tidy	ADE
JM	Treleaven	Incr 'C' 4 Fd Wksp
JD	Trevithick	ADE
PA	Tuck	DEME
RW	Vollett	ADE
EA	Williams	DMT
JA	Wilson	4 Fd Wksp
B	Yarymowich	56 Cdn Inf Wksp

CAPTAINS

LW	Armstrong	2 Coy RCEME
BE	Babcock	6 Pers Depot (Westinghouse)
GE	Ball	56 Cdn Inf Wksp
P	Bateson	HQ 1 CIBG
GN	Brent	DEME
JE	Brown	4 CIBG LAD
PL	Burcombe	202 Base Wksp
FJ	Burton	202 Base Wksp
GR	Burton	7 Coy RCEME
LN	Bydal	RCEME School
JL	Calvert	RCEME School
JNR	Campbell	12 Coy RCEME
AB	Cantlon	RCEME School
FR	Carruthers	DEME
FW	Chapman	Cdn Army Staff College
HW	Chapman	DEME
JF	Clarabut	HQ Cencom
BC	Clerke	CALE (RMC of S)
JE	Coates	DEME
WG	Collins	RCEME School
RDL	Connell	2 CIBG LAD
JH	Cooper	3 Fd Wksp
JN	Courtney	6 Pers Depot (General Motors)
EB	Creber	FGH LAD
AM	Croft	3 Fd Wksp
JJE	Cuddihey	1 LAA Regt LAD
DH	Cumming	RCEME School
DH	Curling	ADE
LA	Daviss	1 RCHA LAD
JD	Delaney	14 Coy RCEME
FF	Doherty	DEME
AS	Etter	4 RCHA LAD
SHJ	Fleming	202 Base Wksp
DH	Fraser	DEME
DV	Geary	1 Fd Wksp
AM	Gilbert	DEME
SA	Girdler	3 Coy RCEME
GE	Grainger	ADE
DA	Grant	Cdn Army Staff College
JR	Griffin	1 CIBG LAD
ADL	Grinham	DEME
WJA	Groom	19 Coy RCEME
GM	Hagan	4 Fd Wksp
WJN	Haggins	DDD
DV	Hampson	1 Fd Wksp
HV	Hann	10 Coy RCEME
PEV	Hansen	6 Coy RCEME
CB	Hellyer	DDD
RV	Hill	4 Coy RCEME
LF	Holland	ADE
HW	House	Incr 'C' 4 Fd Wksp
AW	Hughes	11 Coy RCEME
RG	Humphreys	11 Coy RCEME
CA	Hurst	RCEME School
KR	Joslin	3 RCHA LAD
JJ	Kane	4 Fd Wksp
KT	Kennah	CJATC
JJ	Klinec	RCS of A (AA)
NE	Laviolette	5 Coy RCEME
JW	Lelacheur	56 Cdn Inf Wksp
AC	Leonard	RMC
RW	Libbey	RCEME School
RR	Logan	204 Base Wksp
WF	Lucano	11 Coy RCEME
AM	MacDonald	56 Cdn Inf Wksp
JA	MacDonald	12 Coy RCEME
AJ	MacGillivray	8 Cdn H LAD
RL	MacIntosh	9 Pers Depot
RMG	MacKenzie	16 Coy RCEME
RH	MacLeod	RCEME School
E	MacMillan	202 Base Wksp
DM	Maher	3 Coy RCEME
JD	McDougall	2 RCHA LAD
JS	McIntyre	DEME
RA	McKay-Keenan	2 Fd Wksp
MD	McKinlay	8 Coy RCEME
FJ	McNaughton	CJATC
WJ	Mildon	ADE
CA	Millar	CALE (RMC of S)
JW	Moody	ADE
JF	Moore	DEME
CR	Morgan	202 Base Wksp
DR	Mowbray	CALE
DA	Nicholson	CADEE
PB	Nicholson	ADE
PH	North	LDSH LAD
WH	Norton	4 Fd Wksp
GL	O'Brien	DDD
JF	O'Connor	202 Base Wksp
JR	O'Neill	DEME
FA	Ouimet	RCEME School
TW	Oxley	204 Base Wksp
TR	Palfrey	13 Coy RCEME
KS	Parton	13 Coy RCEME
HR	Perry	DEME
JR	Peters	10 Coy RCEME
R	Peters	13 Coy RCEME
HC	Pfeiffer	204 Base Wksp
HA	Popkin	DQOP
CH	Putt	DEME
JR	Raby	RMC
W	Rhodes	ADE

JA	Richards	11 Coy RCEME
AT	Roberts	204 Base Wksp
HL	Robinson	RCEME School
MR	Robinson	202 Base Wksp
V	Roddick	13 Coy RCEME
HA	Rosson	18 Coy RCEME
LA	Sainsbury	JABC School
DA	Saunders	D Pers
GD	Savage	RCD LAD
RB	Screaton	14 Coy RCEME
RN	Shaw	HQ 4 CIBG
WR	Shaw	RCEME School
JO	Sheehan	DEME
OD	Smithe	2 Coy RCEME
WD	Sneddon	202 Base Wksp
JA	Stott	7 Coy RCEME
EJ	Stow	10 Coy RCEME
WG	Svab	ADE
GW	Swallow	DEME
WA	Thomas	RCEME School
WW	Virtue	16 Coy RCEME
PG	Vyvyan	3 Coy RCEME
HK	Warren	RCEME School
WR	Willing	CAS (W) (Redstone Arsenals)
DPW	Wood	204 Base Wksp
GA	Wright	CAS (W)

LIEUTENANTS

KI	Anderson	4 Fd Wksp
WN	Argue	RCEME School
GF	Bews	ADE
NE	Birchard	Incr 'B' HQ 4 CIBG
JMF	Bourassa	RCEME School
JE	Brewster	14 Coy RCEME
FN	Brodie	RCEME School
CO	Bush	HQ RCEME Cencom
LJE	Byer	RCEME School
DM	Campbell	RCEME School
WM	Campbell	4 Fd Wksp
G	Charles	HQ RCEME Wescom
TM	Chell	RCEME School
JP	Cloutier	5 Coy RCEME
PR	Comeau	RCEME School
EM	Conway	2 Fd Wksp
PR	Dack	RCEME School
JGR	Doucet	RCEME School
JP	Durocher	5 Coy RCEME
S	Dzuba	13 Coy RCEME
CCG	Edgar	10 Coy RCEME
OA	Edmond	Incr 'D' 4 Fd Wksp
HT	Edworthy	RCEME School
AED	Elliott	202 Base Wksp
RJ	Francis	DEME
GL	Gillespie	RCEME School
FB	Goring	204 Base Wksp
RE	Goulding	3 CIBG LAD
NA	Graham	RCEME School
RT	Hare	8 Cdn H LAD
HJ	Hellard	RCEME School
FA	Hlohovsky	LdSH LAD
O	Howard	RCEME School
FG	Hutson	RCEME School
WR	Hyman	202 Base Wksp
ID	Isbester	3 Coy RCEME
AF	Johannes	RCEME School
MC	Johnston	10 Coy RCEME
JR	Kaye	13 Coy RCEME
GW	Keays	3 Coy RCEME
JE	Kerr	DEME
RA	Kyle	1 Fd Wksp
PR	Lavallee	3 Fd Wksp
EV	MacInnis	7 Coy RCEME
RJC	Maillet	11 Coy RCEME
GM	Masuda	1 Fd Wksp
GD	McCulloch	C&D Estb (Queens University)
DG	McKay	7 Coy RCEME
HJ	Millen	13 Coy RCEME
RW	Miller	RCEME School
TME	Mimee	RCEME School
HG	Morgan	FGH LAD
JL	Moyse	56 Cdn Inf Wksp
REM	Nourse	RCEME School
STA	O'Farrell	RCEME School
HA	Patterson	10 Coy RCEME
JE	Peacock	DEME
DB	Perrin	16 Coy RCEME
WC	Perry	8 Coy RCEME
PP	Pospisil	RCEME School
RH	Purton	DCER
JHP	Richard	2 Fd Wksp
GS	Rippengale	RCEME School
PF	Romyn	204 Base Wksp
WGL	Russell	202 Base Wksp
DJ	Seabrook	16 Coy RCEME
WJ	Shearing	14 Coy RCEME
DR	Springett	RCEME School
EL	Taylor	13 Coy RCEME
RH	Thorn	RCEME School
VCY	Valiquette	4 Coy RCEME
DS	Van Dusen	2 Coy RCEME
AG	Waters	3 Fd Wksp
DS	White	204 Base Wksp
DE	Wilson	RCEME School
BH	Wright	DEME
Z	Yarymowich	RCEME School

SECOND LIEUTENANTS

GT	Lake	3 Coy RCEME